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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,232	09/18/2003	Shigekazu Ohtomo	16869G-087500US	7000

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EXAMINER

CAO, ALLEN T

ART UNIT	PAPER NUMBER
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2652

DATE MAILED: 05/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/667,232	Applicant(s) OHTOMO ET AL.	
	Examiner Allen T. Cao	Art Unit 2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-14 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/18/03</u> . | 6) <input type="checkbox"/> Other: _____ |

1. This application contains claims directed to the following patentably distinct species of the claimed invention:

Group I: Claims 1-11 and 13-14; figures 1-2B (regarding to the lower shield and the upper shield).

Group II: Claim 12; figures 3-4 (regarding to the side shield).

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over

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the prior art, the evidence or admission may be used in a rejection under 35

U.S.C. 103(a) of the other invention.

2. During a telephone conversation with Mr. Slone on 5/19/05 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-11 and 13-14. Affirmation of this election must be made by applicant in replying to this Office action. Claim 12 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-2, 4-5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kief et al (US. 6,775,108 B2) in view of Cates (US 6,788,497 B1).

Kief et al discloses a thin film magnetic head 200 having a read unit 209, formed above a substrate 207, including a lower shield 214, a read element 218 and an upper shield 216; a write unit (writer portion; column 3, line 36; figure 2-1) having a lower pole piece 216, an upper pole piece 224, and a coil 226 placed between the lower pole piece and the upper pole piece.

Kief et al also discloses that the lower shield layer 214 having two layers 302 and 306; wherein the layer 302 is a magnetic layer; and a lower pole piece/upper shield 216 also having two layers 304 and 308; wherein the layer 304 is a magnetic layer and the layer 308 is a non-magnetic layer which separated the read unit and the write unit.

Kief et al further discloses that the magnetic layers of the shields have a low coefficient of thermal expansion of 11.5×10^{-6} /K or less (column 4, line 64 to column 5, line 3) as set forth in claims 1 and 13.

Kief et al does not discloses a non magnetic layer separated the read unit and the write unit. Kief et al only discloses that the read unit and the write unit separates by a non-magnetic layer 308; however, the layer 308 is a portion of the upper shield/lower pole.

Cates discloses a thin film magnetic head 300 (figure 9) having a read unit 102, formed above a substrate 116, including a lower shield 112, a read element 108 and an upper shield 110; a write unit 202 having a lower pole piece 226, an upper pole piece 228, and a coil 232 placed between the lower pole piece and the upper pole piece.

Kief et al also discloses a non-magnetic layer 94 separated the read unit 102 and the write unit 202 (figure 9; column 6, lines 61-63 and column 7, lines 43-53).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the thin film magnetic head of Kief et al with a separated non magnetic layer to separate the read unit and the write unit as set forth, supra as taught by Cates.

The rationale is as follows: One of ordinary skill in the art would have been motivated to modify the thin film magnetic head of Kief et al with a separated non magnetic layer to separate the read unit and the write unit as set forth, supra as taught by Cates to isolate/protect between the upper shield of the read unit and the lower pole of the write unit to prevent the two different magnetic materials between the upper shield and the lower pole from inter-diffusing during fabrication and life span of the combined magnetic head. Additionally, Kief et al (column 3, lines 49-51) discloses that "If read/write head 200 were a piggy-back MR head, top shield 216 and bottom pole 216 would be separate layers".

Kief et al also discloses a disk drive 100 having a disk 106; a drive motor for driving the disk (spindle motor); a magnetic head 110 for reading and writing data from and on the disk; a positioning mechanism (actuator arm assembly) for positioning the head; a first circuit system for controlling the disk, motor, head and the positioning mechanism ; and a second circuit system for supplying a write signal to the head and processing a read signal from the head (flex circuit, voice coil motor, servo electronic 130 and a host computer are the first and second circuit systems, column 2, line 62 to column 3, line 10), all as set forth in claim 13.

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Regarding claim 4, Kief et al discloses that the lower shield and the upper shield has a structure of a multilayer.

Regarding claim 5, Kief et al discloses that the layer is NiFe alloy.

Regarding claim 2, Kief et al as modified by Cates do not disclose that the magnetic alloy is a crystalline.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to crystalline the magnetic alloy of the shield layer of Kief et al as modified by Cates through a lab routine experimentation and optimization to improve the magnetic structure characteristics of the magnetic alloy.

6. Claims 3 and 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kief et al and Cates as applied to claim 1 above, and further in view of Pust et al (US 2003/0081359 A1).

Regarding claim 3, Kief et al as modified by Cates do not disclose that the NiFe alloy layer has a composition comprising 30 to 55 wt% Ni.

Pust et al discloses a NiFe alloy layer has a composition comprising 30 to 55 wt% Ni (paragraph [0034]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to manufacture the NiFe alloy layer of Kief et al as modified by Cates having a composition comprising 30 to 55 wt% Ni as set forth, supra as taught by Pust et al to improve the shielding characteristics, thus improve read/write characteristics of the magnetic head.

Regarding claim 6, Kief et al as modified by Cates discloses that the shield is a laminated film consisting of two layers. Kief et al as modified by Cates do not disclose that the NiFe alloy layer having a composition mainly comprising 80 wt% Ni.

Pust et al discloses a NiFe alloy layer has a composition mainly comprising 80 wt% Ni (paragraph [0056]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to manufacture the NiFe alloy layer of Kief et al as modified by Cates having a composition mainly comprising 80 wt% Ni as set forth, supra as taught by Pust et al to improve the shielding characteristics, thus improve read/write characteristics of the magnetic head.

Regarding claims 7 and 10, see the rejection of claim 2 in the above rejection

Regarding claims 8 and 11, see the rejection of claim 3 as set forth, in the above rejection.

Regarding claim 9, Kief et al discloses that a ratio of a thickness of the magnetic material having low coefficient of thermal expansion to a sum of thickness of the lower shield and the upper shield is 30% or more (column 5, lines 12-22).

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kief et al as modified by Cates as applied to claim 13 above, and further in view of Alfoqaha et al (US. 6,859,343 B1).

Regarding claim 14, Kief et al as modified by Cates do not disclose that the flying height from an air bearing surface to the medium is 20 nm or less.

Alfoqaha et al discloses a disk drive having a magnetic head/slider 35 and a disk 14; wherein the flying height from an air bearing surface of the head/slider to the disk/medium is 20 nm or less (column 7, lines 1-10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to indicate that the flying height of Kief et al as modified by Cates is 20 nm or less as set forth, supra as taught by Alfoqaha et al.

The rationale is as follows: One of ordinary skill in the art would have been motivated to indicate that the flying height of Kief et al as modified by Cates is 20 nm or less as set forth, supra as taught by Alfoqaha et in order to achieve an optimal magnetic flux induction during recording and to also maintain a safe distance so as to prevent any catastrophic, physical contact between the read/write element and a spinning magnetic disk/medium.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen T. Cao whose telephone number is (571) 272-7569. The examiner can normally be reached on Mon - Thurs (7:30 - 6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Allen Cao
Primary Examiner

AC
May 16, 2005